

New ETSI-CEN-CENELEC approach for rapid SG deployments

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CIM User Group, Oslo
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Policy Drivers

Sustainability: 20-20-20 targets

- Reduction of CO₂ emissions
- Increased generation based on renewable sources and
- Need to increase grid and consumption efficiency - decrease losses

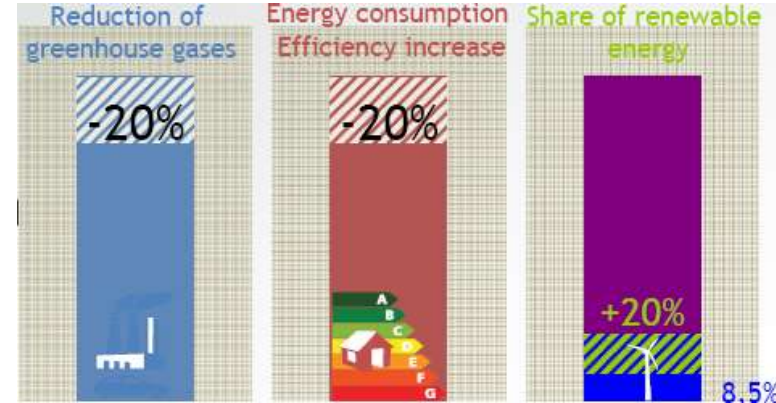
Security of supply

- Increase grid robustness and resilience
- Integration of different generators (centralised and distributed)

Competitiveness and Internal Market development

- Better management of supply and demand
- New market opportunities and increased efficiency of the market
- Empowerment of consumers

All these challenges call for the restructuring of the grids, e.g. the structure of generation, market and the use of electricity



Legal Framework

Energy Efficiency Directive (2006/32/EC, Annex3)

has identified smart meters as one of the main measures, contributing to the overall energy efficiency improvement.

Renewables Directive (2009/28/EC, Art16)

views Smart Grids as an enabler for integration of increasing renewable energy into the grid and obliges the Member States to develop transmission and grid infrastructure towards this aim.

3rd Package for the internal energy market (Directives 2009/72/EC+ 2009/73/EC), **among others:**

- defines tasks and provisions for the organisation of the electricity and gas sectors relevant for the implementation of Smart Grids
- encourages decentralised generation and energy efficiency
- imposes an obligation of roll-out of smart metering by 2020

Mandate M490

Description of mandated work

- **Technical Reference Architecture**

will represent the functional information data flows between the main domains and integrate many systems and subsystems architectures

- **Set of Consistent Standards**

will support the information exchange (communication protocols and data models) and the integration of all users into the electric system operation.

- **Sustainable standardization processes**

and collaborative tools to enable stakeholder interactions, to improve the two above and adapt them to new requirements based on gap analysis, while ensuring the fit to high level system constraints such as interoperability, security, and privacy, etc.



European Standards Organizations



<http://www.cen.eu>

European Committee for Standardization

31 Members (NSB/NC of 27 EU Members + 3 EFTA countries + 1 EU applicant)



<http://www.cenelec.eu>

European Committee for Electrotechnical Standardization

31 Members (NSB/NC of 27 EU Members +3 EFTA countries + 1 EU applicant)



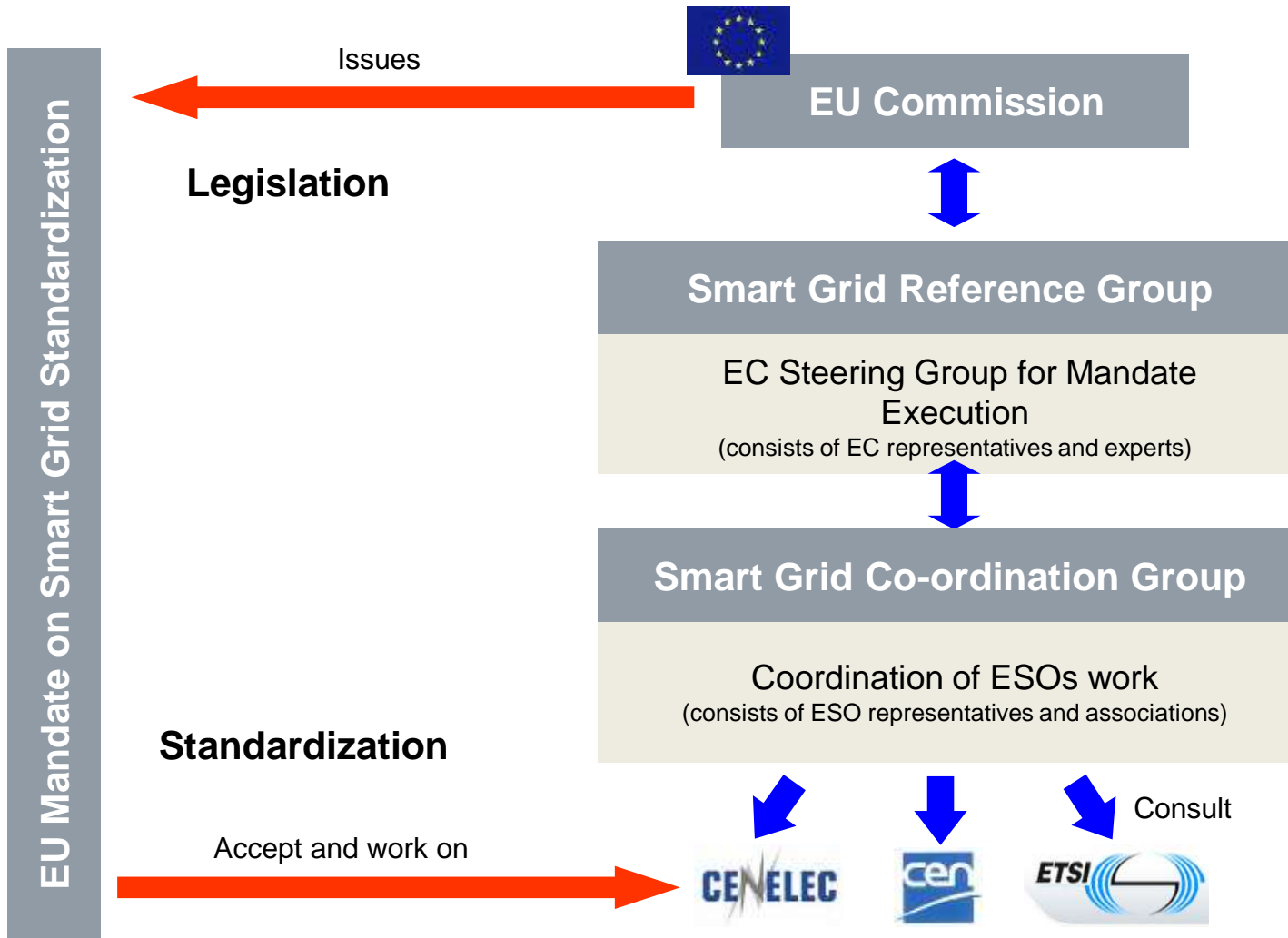
<http://www.etsi.org>

European Telecommunications Standards Institute

700 ETSI member organizations from 60 countries worldwide

**“Recognized” by the European Union under
Directive 1025/2012**

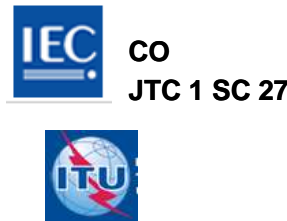
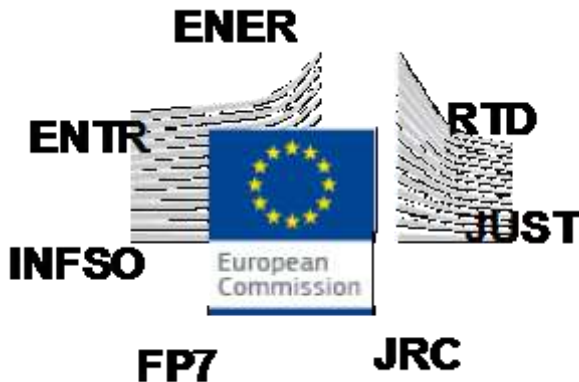
Current Setup of standardization



SG-CG – Who are we?



SMART GRID Coordination Group (established June 2011)



International Activities



- SG-CG Smart Grid
- European Technology platform
FutuRed – Spanish Electrical Grid Platform;
Smart Grids-Roadmap Austria; Electricity
Networks Strategy Group (UK) etc.
- Smart Metering EU-Mandate M/441
- Electrical vehicle Mandate – M/461



- DKE, VDE „German standardization roadmap E-Energy“
BMWi Uslar et al „Investigation of standardization for BMWi-project E-Energy“
- BDI „Internet of Energy“



- METI, JISC
Roadmap to international standardization Smart Grid



- SGCC
The State Grid Corporation of China –
Smart Grid Framework



- IEEE SCC21 Standards
Coordinating Committee on Fuel Cells, Photovoltaics, Dispersed Generation, and Energy Storage
- IEEE P2030 Standard
Interoperability Smart Grid Concepts

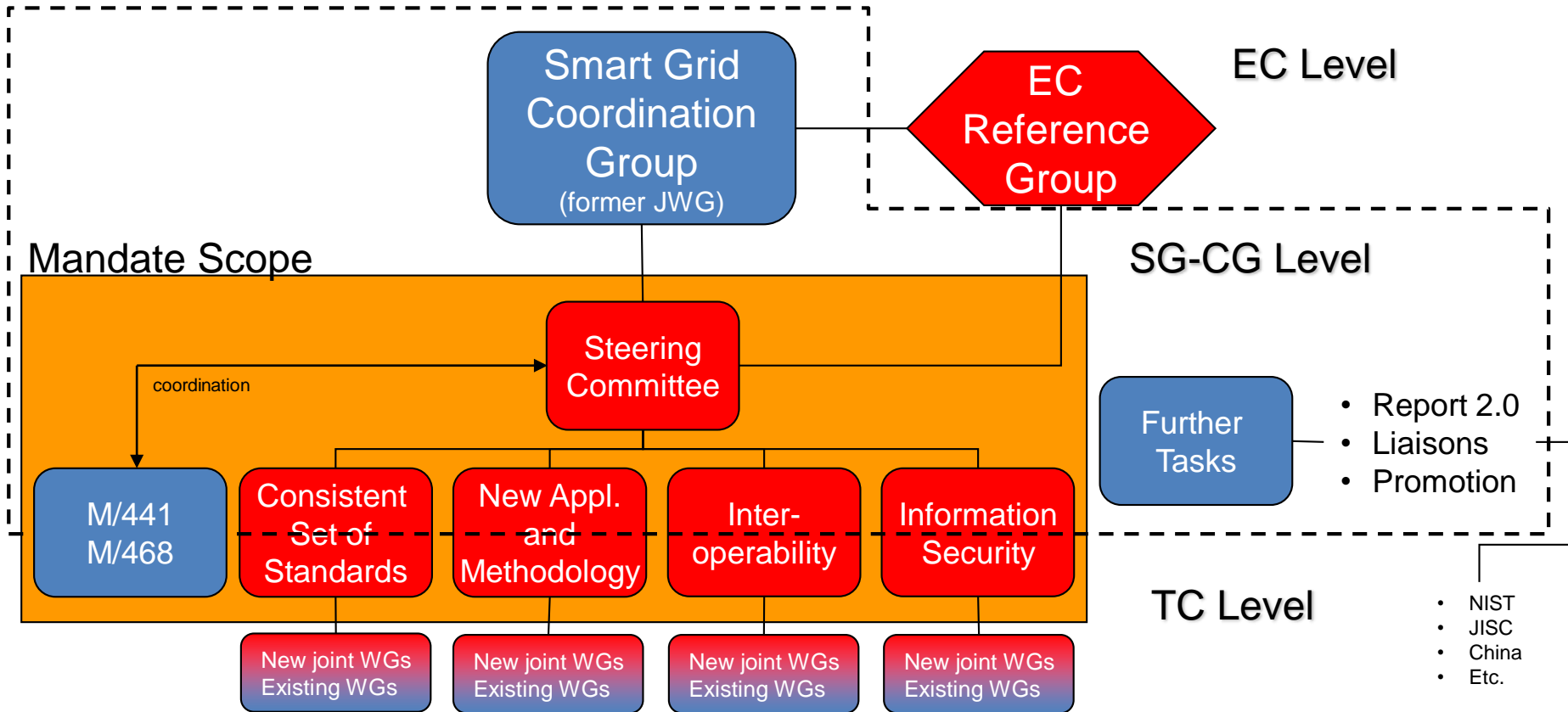


- IEC/SMB Strategy Group 3 (SG3)
„Smart Grid“ - Roadmap
- UCAiug - Open Smart Grid Subkomitee
- ITU Smart Grid
- CIGRE D2.24

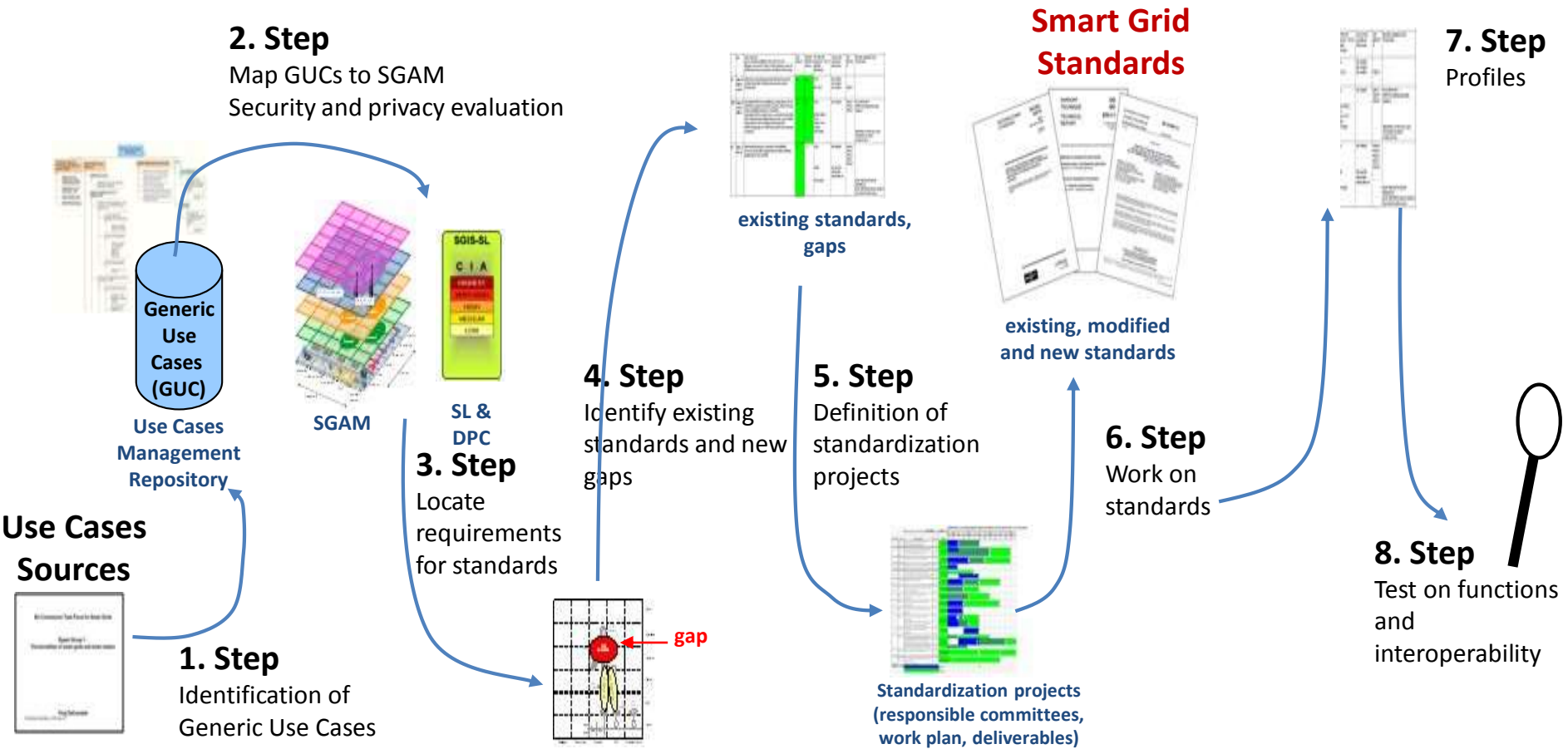


- NIST Framework and Roadmap for Smart Grid Interoperability Standards
- SGIP
- Intelligent
- Gridwise Alliance

Structure of SG-CG



Process including testing



source: SG-CG

Smart Grid Architecture Model SGAM

Business Layer

- Represents business models and regulatory requirements

Service/Function Layer

- Represents logical functions or applications independent from physical implementations

Information Layer (OSI 6-7)

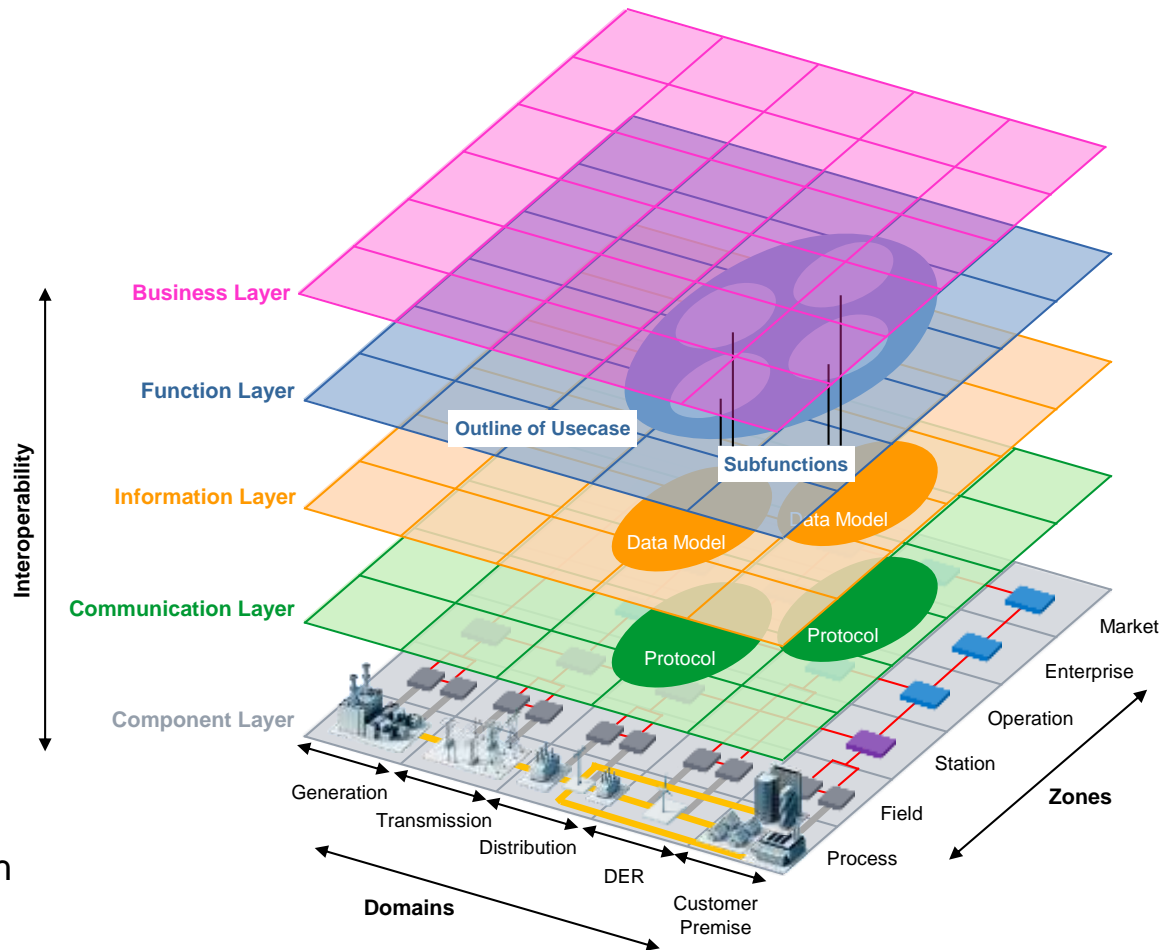
- Represents information objects or data models required to fulfill functions and to be exchanged by communication

Communication Layer (OSI 1 – 5)

- Represents protocols and mechanisms for the exchange of information between components

Component Layer

- Represents physical devices which host functions, information and communication means

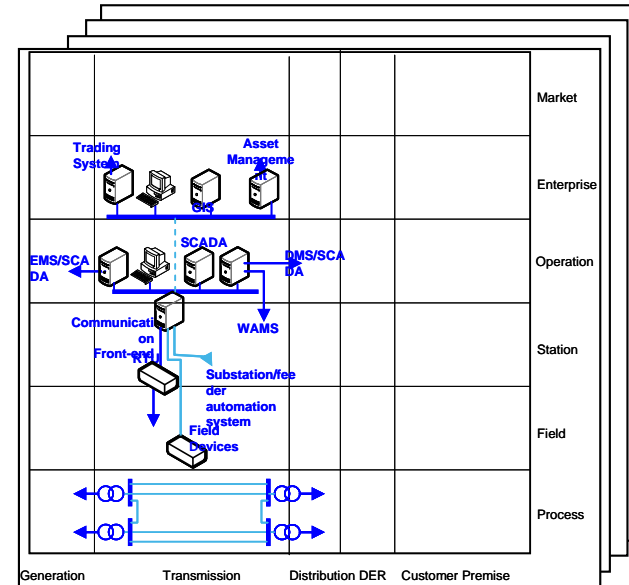
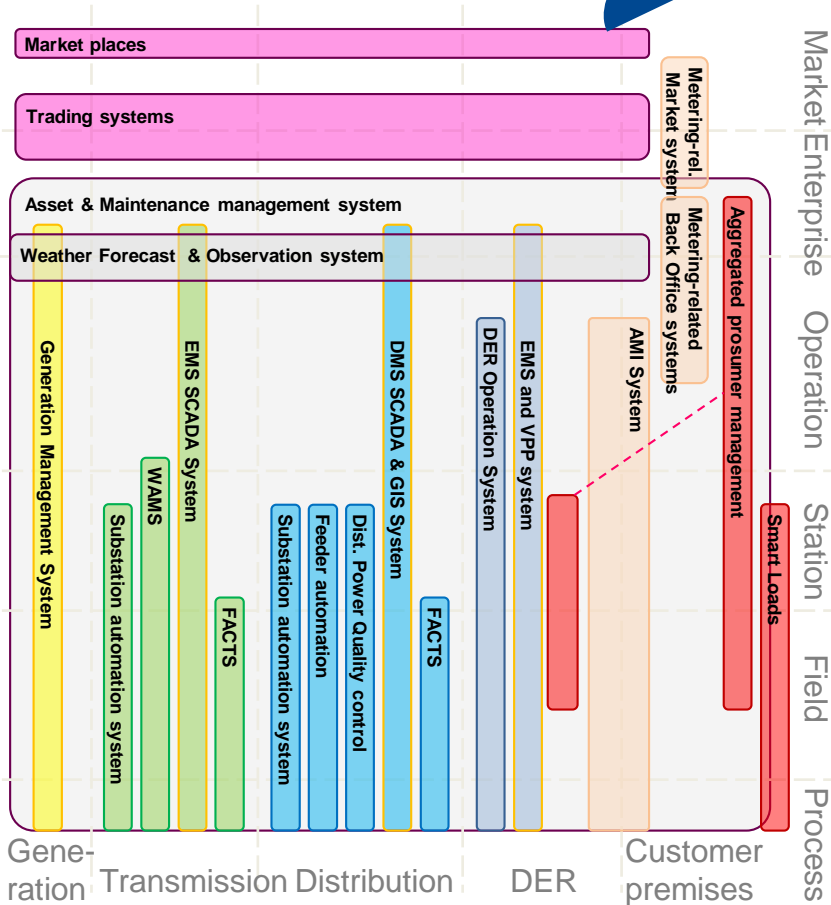


SGIS Security Levels

Security Level	Security Level Name	European Grid Stability Scenario Security Level Examples
5	Highly Critical	Assets Disruption Above 10GW Pan-European Incident
4	Critical	Assets Disruption from above 1GW to 10 GW European or Country Incident
3	High	Assets Disruption from above 100 MW to 1 GW Country or Regional Incident
2	Medium	Assets Disruption from 1 MW to 100 MW Regional or Town Incident
1	Low	Assets Disruption under 1 MW Town or Neighborhood Incident

First set of standards - report

Mapping of Systems on SGAM

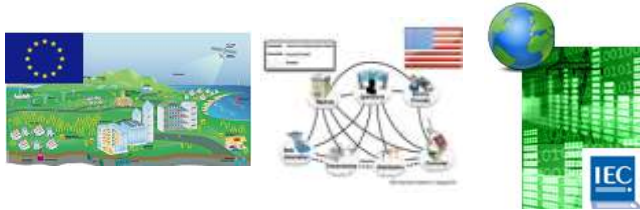


Reference Architecture of each system

source: SG-CG

Layer	Standard	Comments
Information	EN 61970-1 EN 61970-2 EN 61970-301 EN 61970-401 EN 61970-453 EN 61970-501	Energy management system Application Program Interface
Communication	IEC/TR 62325	Framework market communication
Communication	EN 60870-5-101 EN 60870-5-104 EN 60870-6	Telecontrol protocols
Information	IEC/EN 61850 (all parts)	See substation automation system in 8.3.1
Information	IEC 62351	Security - all parts
Information (guidelines)	IEC 62357	Reference architecture power system information exchange
Information	IEC 62361	Harmonization of quality codes

Core Standards



Architecture

- IEC 62357:
Seamless Integration Reference Architecture

Communication

- IEC 60870: Transport protocols

Data Models

- e.g. EN 60870-5-104:2001-05
- IEC 61970/61968: Common Information Model CIM
e.g. EN 61970-405:2007-09, EN 61968-3:2004-06

Market

- IEC 62325: Market Communications using CIM

DER

- IEC 61850, 61850-7-4XX: SAS, Communications, DER
EN 61850-7-420:2009-06

RES

- IEC 61400: Communications for monitoring and control of wind power plants
EN 61400-1:2004-02

Security

- IEC 62351: Security for Smart Grid

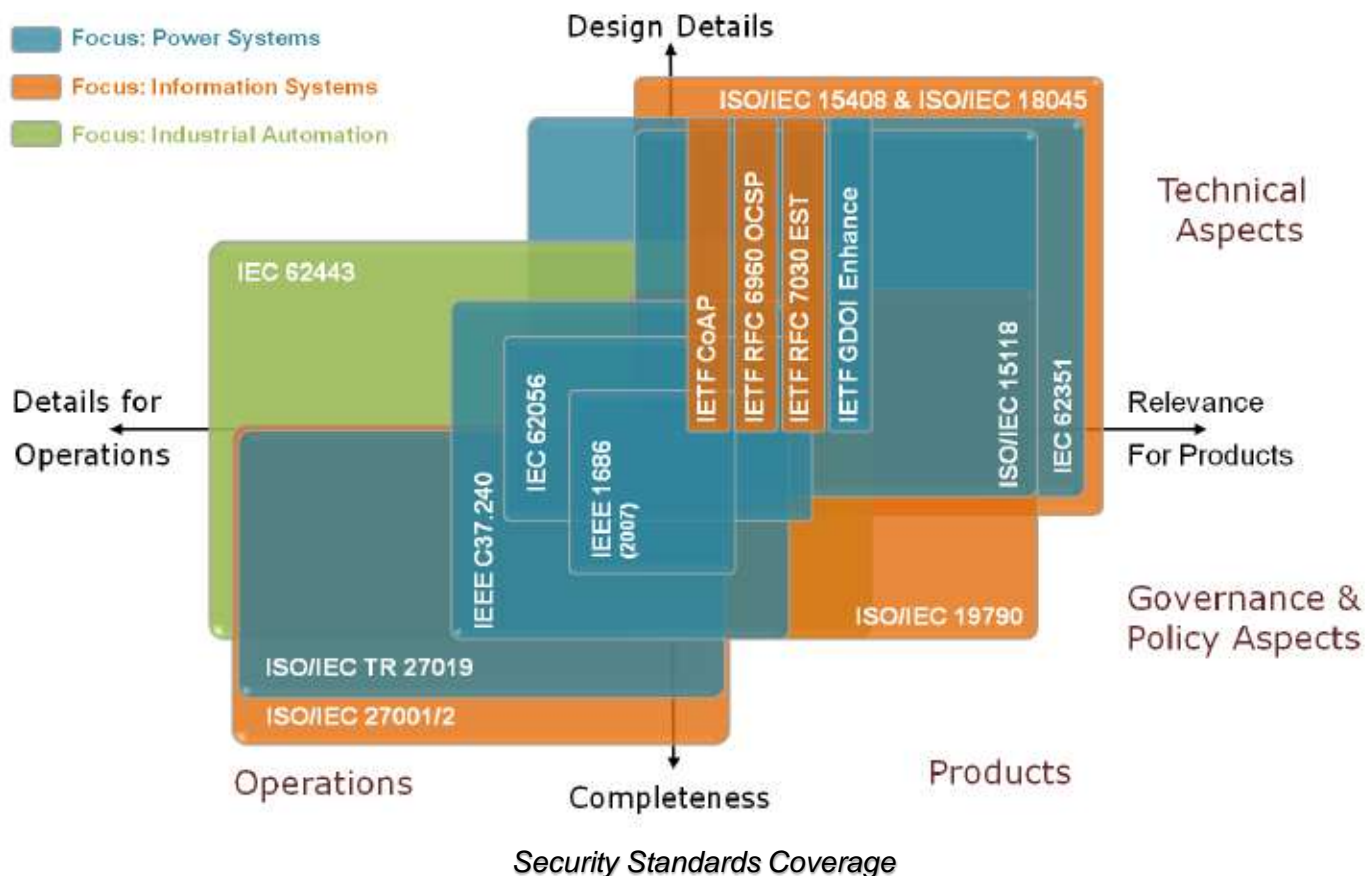
Metering

- IEC 61334: DLMS
- IEC 62056: COSEM
e.g. EN 62056-53:2002-06

Home&Building

- EN 50090 (KNX)
(ISO/IEC JTC1 SC25 -ISO/IEC 14543-3, CEN/TC 247 (BACS/HLK) -EN 13321 -1 und -2)

SG-CG/SGIS WP1: Smart Grid Set of Security Standards



Selected Standards Coverage, SGAM Mapping and Detailed Analysis are Presented in This Section

SG-CG/SGIS WP2: Cyber Security

European Set of Recommendations Domains		SGIS Security Levels					SGAM		
		1	2	3	4	5	Domains	Zones	Layers
ENISA Security Measures Domains	Security governance & risk management	***	***	***	***	***	All	All	Business, Function
	Third parties management	*	*	**	**	**	All	Station, Operation, Enterprise, Market	Business, Function
	Secure lifecycle process for smart grid components and operating procedures	**	**	***	***	***	All	All	Business, Function, Component
	Personnel security, awareness and training	*	*	**	**	***	All	All	Business, Function
	Incident response & information knowledge sharing	*	**	**	***	***	All	Station, Operation, Enterprise, Market	Business, Function
	Audit and accountability capability	*	*	**	**	***	All	Station, Operation, Enterprise, Market	All
	Continuity of operations capability	***	***	***	***	***	All	All	All
	Physical security	*	**	**	***	***	All	Process, Field, Station, Operation	Business, Function
	Information systems security	**	**	***	***	***	All	All	All
	Network security	**	**	***	***	***	All	All	Function, Information, Communication, Component
New	Situational Awareness	**	**	***	***	***	All	All	All
	Liability	*	**	**	***	***	All	All	Business, Function

European Set of Recommendations Dashboard

European Set of Recommendations and Applied Information now in place

Interoperability

Deliverable: according to details given in the letter to commission

Methodology for interoperability

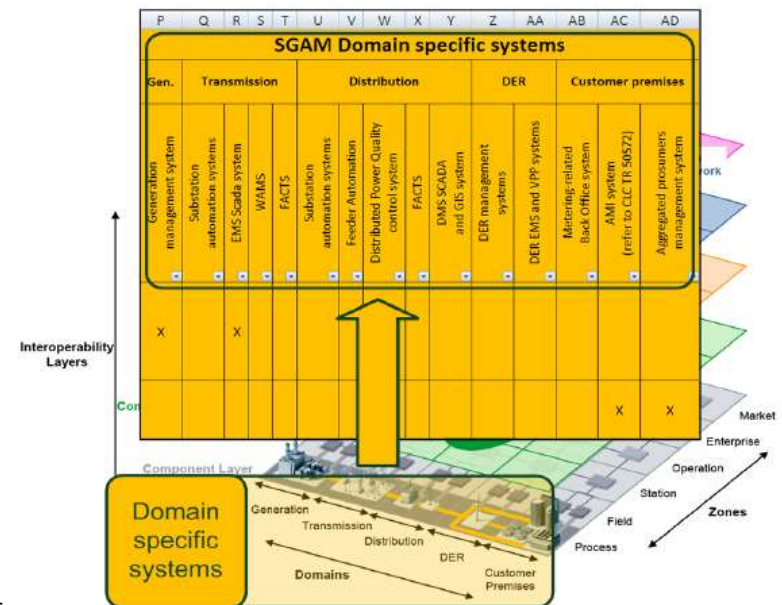
- A system interoperability testing method including conformance testing, "profiles" and "test use cases", should be provided by the end of 2013

Survey on existing

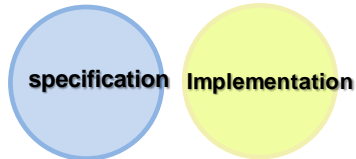
- A conformance testing map should be provided by the end of 2013

Recommendations for deployment

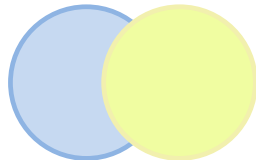
- An assessment of needed profiles (limiting implementation options given by the standards to improve interoperability), should be provided by the end of 2014



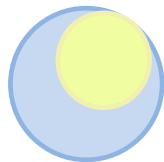
Interoperability - terminology



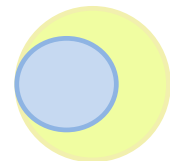
Irrelevant
The implementation has no features in common with the specification. (so the question of conformance does not arise).



Consistent
The implementation has some features in common with the specification, and those features are implemented in accordance with the specification. However some features in the specification are not implemented, and the implementation has other features that are not covered by the specification.



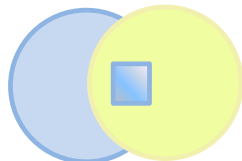
Compliant
Some features in the specification are not implemented, but all features implemented are covered by the specification, and are in accordance with it.



Conformant
All the features in the specification are implemented in accordance with the specifications, but some more features are implemented that are not in accordance with it.



Fully Conformant
There is full correspondence between specification and implementation. All specified features are implemented in accordance with the specification and there are no features implemented that are not covered by the specification.



Non-Conformant
Any of the above in which some features in the specification are implemented not in accordance with the specification.

Summary

Achievements

- Consensus
- On time
- International acknowledgement

Standardization is ready

- Systematic process in place
- Current industry applications are supported by standards
- Selection guide available - easy entry for all stakeholders
- Overview on available and coming standards
- Work programme describes time table for new standards
- Future requirements can be easily included in systematic framework



Thank you for your attention

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